

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in this application:

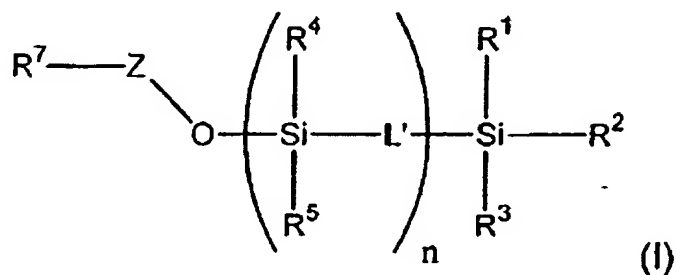
Listing of claims:

1. (Currently Amended) A binder system for a paint formulation comprising ~~The use of an~~ organosilyl ester of a carboxylic, sulphonic or phosphoric acid as an alkaline hydrolysis or erodability booster ~~for the binder system of a paint formulation.~~
2. (Currently Amended) The binder system use according to claim 1, comprising wherein more than one organosilyl ester ~~silylester~~ of a carboxylic, sulphonic or phosphoric acid ~~are used in any such paint formulation ie. a mixture of such silylesters are utilised as~~ boosters.
3. (Currently Amended) The binder system use according to claim 1 ~~or 2~~, wherein the carboxylic, sulphonic or phosphoric acid part of the organosilylester has a non-vinylic alpha carbon.
4. (Currently Amended) The binder system use according to claim 1 ~~any of claims 1-3,~~ ~~wherein the binder system~~ which comprises a film forming binder.
5. (Currently Amended) The binder system use according to ~~any preceding claim 1,~~ wherein the organosilylester ~~of the invention~~ is ~~also independently~~ film forming.
6. (Previously Presented) A film forming or resinous binder for a paint composition comprising organosilylesters of carboxylic, sulphonic or phosphoric acid, said acid having a non-vinylic alpha carbon and being other than rosin.
7. (Currently Amended) The binder system of claim 3, wherein said carboxylic acid is a use ~~of organosilylesters of monocarboxylic acid and is a binder component of the binder~~

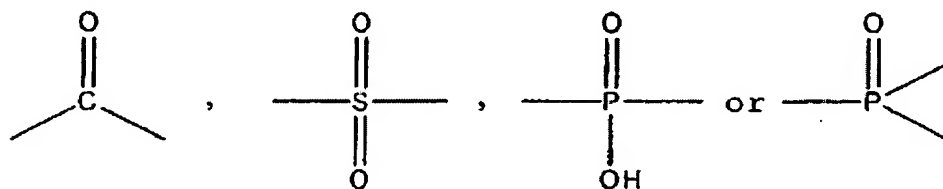
~~system, sulphonic or phosphoric acids, said acids having a non-vinyl alpha carbon and being other than rosin as a binder component of a paint binder system.~~

8. (Original) A paint composition comprising organosilylestere of monocarboxylic, sulphonic or phosphoric acids, said acids having a non-vinyl alpha carbon and being other than rosin.
9. (Currently Amended) A paint composition according to claim 8, wherein the paint composition comprises a binder system, ~~the~~ said binder system comprising ~~the~~ said organosilylestere of monocarboxylic, sulphonic or phosphoric as a binder component.
10. (Currently Amended) A paint composition comprising silylestere of monocarboxylic, sulphonic or phosphoric acid other than rosin as a binder component of a ~~the~~ binder system.
11. (Currently Amended) A ~~use, binder or~~ paint composition according to ~~any preceding claim 8, wherein there are mixtures~~ which comprises a mixture of organosilyl estere of ~~monocarboxylic~~ carboxylic, sulphonic or phosphoric acids.
12. (Currently Amended) A process for preparing a paint composition characterised in that one step of the process is the addition of ~~a binder component comprising~~ organosilylestere of acids other than rosin as a binder component of a ~~the~~ binder system.
13. (Currently Amended) A process for preparing a paint composition according to claim 12, wherein the paint composition is an antifouling paint.
14. (Currently Amended) A ~~use, process, binder or paint~~ composition according to ~~any preceding claim 1~~, wherein the organosilyl estere of the carboxylic, sulphonic or phosphoric acid is based on a hydrocarbonyl residue of greater than or equal to C3.

15. (Currently Amended) A ~~use, process, binder or~~ paint composition according to ~~any preceding claim 8,~~ wherein the organosilyl ester of the acid is represented by the general formula (I):



wherein Z represents:



wherein each R^4 and R^5 may be hydroxyl or may be independently selected from alkyl, aryl, alkoxyl, aryloxy, $-\text{L}'-\text{SiR}^1\text{R}^2\text{R}^3$, $-\text{L}'-(\text{SiR}^4\text{R}^5\text{L}')_n-\text{SiR}^1\text{R}^2\text{R}^3$, $-\text{L}'-\text{SiR}^1\text{R}^2-$, $-\text{L}'-(\text{SiR}^4\text{R}^5\text{L}')_n-\text{SiR}^1\text{R}^2-$, alkenyl, alkynyl, aralkyl or aralkyloxy radicals optionally substituted by one or more substituents independently selected from the group comprising alkyl, alkoxyl, aralkyl, aralkyloxy, hydroxyl, aryl, aryloxy, halogen, amino (~~preferably, tertiary amino~~) or amino alkyl radicals, or R^4 or R^5 may independently be an $-\text{O}-\text{Z}-\text{R}^8$ group, wherein R^8 is defined as R^7 below;

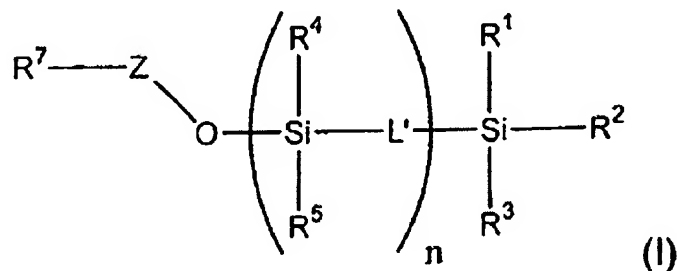
wherein each R^1 , R^2 and R^3 may independently represent hydrogen, hydroxyl, alkyl, alkenyl, alkynyl, alkoxyl, aryl, aryloxy, aralkyl or aralkyloxy radical optionally substituted by one or more substituents independently selected from the group comprising alkyl, alkoxyl, aralkyl, aralkyloxy, aryl, aryloxy, halogen, hydroxyl, amino (~~preferably, tertiary amino~~) or amino alkyl radicals, or R^1 , R^2 or R^3 may independently be an $\text{O}-\text{Z}-\text{R}^8$ group,

L' represents O, S, or NR^6 , where R^6 is defined as is R^9 below,

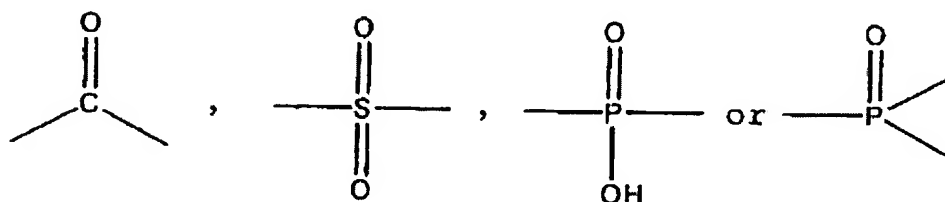
each n independently represents a number of $-\text{Si}(\text{R}^4)(\text{R}^5)-\text{L}'-$ groups from 0 to 1000,

wherein R^7 is an aralkyl, aryl, alkenyl, alkynyl, or a C_2 or higher alkyl group optionally substituted, in the case of the hydrocarbonyl radicals with one or more substituents selected from the equivalent substituents as defined for R^1 , R^2 , R^3 , R^4 and R^5 above.

16. (Currently Amended) A process for producing a silyl ester of formula (I)



wherein Z represents:



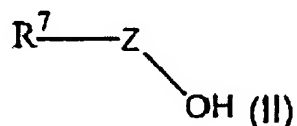
wherein each R^4 and R^5 may be hydroxyl or may be independently selected from alkyl, aryl, alkoxyl, aryloxy, $-L'-SiR^1R^2R^3$, $-L'-(SiR^4R^5L')_n-SiR^1R^2R^3$, $-L'-SiR^1R^2-$, $-L'-(SiR^4R^5L')_n-SiR^1R^2-$, alkenyl, alkynyl, aralkyl or aralkyloxy radicals optionally substituted by one or more substituents independently selected from the group comprising alkyl, alkoxyl, aralkyl, aralkyloxy, hydroxyl, aryl, aryloxy, halogen, amino (~~preferably, tertiary amino~~) or amino alkyl radicals, or R^4 or R^5 may independently be an $-O-Z-R^8$ group, wherein R^8 is defined as R^7 below;

wherein each R^1 , R^2 and R^3 may independently represent hydrogen, hydroxyl, alkyl, alkenyl, alkynyl, alkoxyl, aryl, aryloxy, aralkyl or aralkyloxy radical optionally substituted by one or more substituents independently selected from the group comprising alkyl, alkoxyl, aralkyl, aralkyloxy, aryl, aryloxy, halogen, hydroxyl, amino (~~preferably, tertiary amino~~) or amino alkyl radicals, or R^1 , R^2 or R^3 may independently be an $-O-Z-R^8$ group,

L' represents O, S, or NR^6 , where R^6 is defined as is R^9 below,

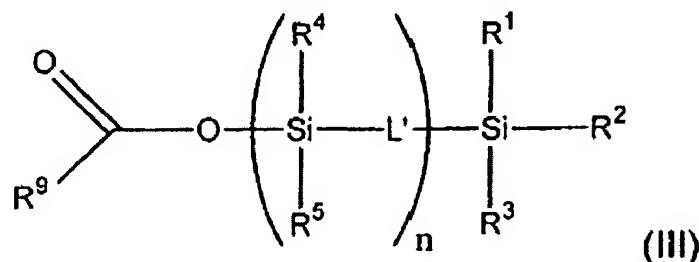
each n independently represents a number of $-Si(R^4)(R^5)-L'-$ groups from 0 to 1000,

wherein R^7 is an aralkyl, aryl, alkenyl, alkynyl, or a C_2 or higher alkyl group optionally substituted, in the case of the hydrocarbonyl radicals with one or more substituents selected from the equivalent substituents as defined for R^1 , R^2 , R^3 , R^4 and R^5 above with the proviso that when R^7 is an alkenyl or alkynyl it does not include a vinylic alpha carbon; by reaction of a higher boiling acid of formula (II)



wherein Z and R^7 are as described above;

with a silyl ester of a lower boiling acid of formula (III)



wherein R^1 , R^2 , R^3 , R^4 , R^5 , L' and n are defined above except where R^1 , R^2 , R^3 , R^4 or R^5 are an $-O-Z-R^8$ group in ~~formula (I)~~ they may be replaced by an $-O-Z-R^{10}$ group in formula (III);

wherein R^9 is defined as R^7 above except R^9 may also be hydrogen or C_1 alkyl and with the proviso that the acid of the ester formed by R^9 (R^9ZOH) boils at a lower temperature than the acid R^7ZOH of formula (II);

wherein ~~R^{10}~~ is defined as R^7 above except R^{10} may also be hydrogen or C_1 alkyl and with the proviso that the acid of the ester formed by R^{10} ($R^{10}ZOH$) boils at a lower temperature than the acid R^7ZOH of formula (II);

while removing the formed acid group of formula (IV) and/or (V)

R^9ZOH (IV)

$R^{10}ZOH$ (V)

from the system to produce at least one protected acid group of said formula (I).

17. (Currently Amended) A ~~use, process, binder or paint composition~~ according to claim 15 ~~or 16~~, wherein when an acyated silyl ester is represented by formula (I) ~~formula I~~ it has more than one acyloxy group attached to one or several silicon atoms.
18. (Currently Amended) A ~~use, process, binder or paint composition~~ according to claim 16 ~~any of claims 15-17~~, wherein the carboxyl radical part of formula (IV) is selected from formyl, acetyl, propionyl and butyryl.
19. (Currently Amended) A ~~use, process, binder or paint composition~~ according to claim 16 ~~any of claims 15-18~~, wherein the carboxyl radical part of formula R^7ZOH independently includes propionyl, butyryl, pivaloyl, oxaloyl, malonyl, succinyl, glutaryl, adipoyl, benzoyl, phthaloyl, isobutyryl, sec-butyryl, octanoyl, isooctanoyl, nonanoyl, isononanoyl, abietyl, dehydroabietyl, dihydroabietyl, naphththenyl, anthracenyl, abietyl dimer (Dymerex®), fully hydrogenated dihydroabietyl (Foral®) and the like and polymers or copolymers thereof.
20. (Currently Amended) A ~~use, process, binder or paint composition~~ according to claim 16 ~~any of claims 16-19~~, wherein the organosilylated carboxylate compound ~~compounds~~ of general formula (III) ~~is include~~ trimethylsilylformiate, dimethylsilyldiformiate, methylsilyltriformiate, tri-n-butyl 1-acetoxy-silane, di-n-butyl 1,1-diacetoxysilane, n-butyl 1,1,1-triacetoxy-silane, tri-n-propyl-1-acetoxy silane, di-n-propyl 1,1-diacetoxy-silane, n-propyl 1,1,1-triacetoxy-silane, tri-t-butyl-1-acetoxy-silane, tri-isopropyl-1-acetoxy-silane, tri-isobutyl-1-acetoxy-silane, tri-methyl-1-acetoxy-silane, di-methyl 1,1-diacetoxy-silane, methyl 1,1,1-triacetoxy-silane, triethyl-1-acetoxy-silane, diethyl-1,1-diacetoxy-silane, ethyl 1,1,1-triacetoxy-silane, vinyl 1,1,1-triacetoxy-silane, tribenzyl-1-acetoxy-silane, triamyl-1-acetoxy-silane, triphenyl-1-acetoxy-silane, trimethylsilylpropionate, t-butyl dimethylsilylacetate, pentamethyl-1-acetoxy-disiloxane, heptamethyl-1-acetoxy-trisiloxane, nonamethyl-1-butyl dimethylsilylacetate, pentamethyl-1-acetoxy-disiloxane, heptamethyl-1-acetoxy-trisiloxane, nonamethyl-1-acetoxy-tetrasiloxane, nonaethyl-1-acetoxy-tetrasiloxane, nona-t-butyl-1-acetoxy-tetrasiloxane, nonabenzyl-1-acetoxy-tetrasiloxane, nona-isopropyl-1-acetoxy-

tetrasiloxane, nona-n-propyl-1-acetoxy-tetrasiloxane, nona-isobutyl-1-acetoxy-tetrasiloxane, nona-amyl-1-acetoxy-tetrasiloxane, nona-n-butyl-1-acetoxy-tetrasiloxane, nona-dodecyl-1-acetoxy-tetrasiloxane, nona-hexyl-1-acetoxy-tetrasiloxane, nona-phenyl-1-acetoxy-tetrasiloxane, nona-octyl-1-acetoxy-tetrasiloxane, undecamethyl-1-acetoxy-pentasiloxane, undecaethyl-1-acetoxy-pentasiloxane, undeca-t-butyl-1-acetoxy-pentasiloxane, undecabenzyl-1-acetoxy-pentasiloxane, undeca-isopropyl-1-acetoxy-pentasiloxane, undeca-n-propyl-1-acetoxy-pentasiloxane, undecaisobutyl-1-acetoxy-pentasiloxane, undeca-amyl-1-acetoxy-pentasiloxane, undeca-n-butyl-1-acetoxy-pentasiloxane, undeca-dodecyl-1-acetoxy-pentasiloxane, undeca-hexyl-1-acetoxy-pentasiloxane, undeca-phenyl-1-acetoxy-pentasiloxane, undeca-octyl-1-acetoxy-pentasiloxane, tridecamethyl-1-acetoxy-hexasiloxane, tridecaethyl-1-acetoxy-hexasiloxane, trideca-t-butyl-1-acetoxy-hexasiloxane, tridecabenzyl-1-acetoxy-hexasiloxane, trideca-isopropyl-1-acetoxy-hexasiloxane, trideca-n-propyl-1-acetoxy-hexasiloxane, trideca-isobutyl-1-acetoxy-hexasiloxane, trideca-amyl-1-acetoxy-hexasiloxane, trideca-n-butyl-1-acetoxy-hexasiloxane, trideca-dodecyl-1-acetoxy-hexasiloxane, tridecahexyl-1-acetoxy-hexasiloxane, trideca-phenyl-1-acetoxy-hexasiloxane, or trideca-octyl-1-acetoxy-hexasiloxane.

21. (Currently Amended) A ~~use, process, binder or paint composition~~ according to claim 16 ~~any of claims 16-20~~, wherein the organosilylated carboxylate compound ~~compounds~~ of general formula (III) ~~is are~~ selected from ethyl triacetoxysilane, vinyltriacetoxysilane, dimethyldiacetoxysilane and trimethylsilylacetate.
22. (Currently Amended) A ~~use, process, binder or paint composition~~ according to claim 16 ~~any of claims 15-21~~, wherein said ~~examples of~~ higher boiling acids ~~acids~~ which can be silylated to produce said silylester of formula (I) is selected from ~~the silylesters of the present invention include~~ acids of C₃ and above ~~ie. aliphatic acid homologues greater than or equal to propionic such as naphthenic acid; and C₄-C₆₀ acids (including aromatic or unsaturated acids) such as hydrogenated rosin.~~

23. (Currently Amended) A ~~use, process, binder or paint composition according to any preceding claim 8, further comprising a co-binder wherein the co-binders which may be used in combination with the silylesters as defined may be selected from:~~
- Resinates of Ca, Cu or Zn
 - Naphthenates of Ca, Cu, Zn
 - Vinyls like Laroflex MP (commercially available from BASF)
 - Acrylates like Neocryl B725 (commercially available from Avecia) ~~Cu/Zn/Ca acrylates, e.g. as described in EP 342276; EP 982324 (Kansai) or polyesters e.g. as described in EP 1033392 (Kansai); Tri-organosilyl(meth)acrylates copolymers as described e.g. in EP 131628 (M&T); US 4593055 (M&T); EP 775773 (Chugoku); EP 646630 (NOF); US 5436284 (NOF); WO 0162811 and WO 0162858 (SIGMA COATINGS); Hydrophilic (meth) acrylates such as e.g. described in FR 2 557 585 (Jotun); EP 526441 and EP 289441 (SIGMA COATINGS)~~
 - Cu/Zn/Ca acrylates or polyesters
 - Tri-organosilyl(meth)acrylate copolymers
 - Hydrophilic (meth) acrylates.
24. (Currently Amended) A ~~use, process, binder or paint composition according to claim 23, wherein said co-binder is the co-binders which may be used in combination with the silylesters as defined are selected from tri organo silyl(meth) acrylate copolymers.~~
25. (Currently Amended) A ~~use, process, binder or paint composition according to claim 24, wherein the binder incorporates~~ binders incorporate poly(silylesters) or polyfunctional acids such as abietyl dimers to help improve the film forming properties of the binder.
26. (New) A process according to claim 16, wherein said higher boiling acid which can be silylated to produce said silylester of formula (I) is selected from aliphatic acid homologues greater than or equal to propionic acid, cyclic aliphatic acids, C4-C60 aromatic and unsaturated cyclic acids.

27. (New) A process according to claim 16, wherein said higher boiling acid which can be silylated to produce said silylester of formula (I) is hydrogenated rosin.
28. (New) A paint composition according to claim 24, wherein the binder incorporates abietyl dimers to help improve the film forming properties of the binder.